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Communication

FOOT-AND-MOUTH DISEASE IN THE BECHUANALAND PROTECTORATE

INTRODUCTION

In view of the vital importance of foot-and-mouth disease, both to the veterinarian and the agriculturalist, any eradication measures which can be successfully applied are of paramount importance.

The Foot-and-Mouth Disease Research Committee in Great Britain and a number of individual workers have done much good work, have carried out exhaustive experiments and have added considerably to our knowledge of the disease, but much still remains to be done.

The charge—unjust though it may be—is often made by farmers, stock-breeders and others, that we, as a profession, have failed to produce an effective curative or preventive and that in consequence the Ministry of Agriculture and Fisheries has still to rely on the primitive method of wholesale slaughter.

The report* of the measures taken in the Bechuanaland Protectorate to deal with the outbreak which occurred there in 1934 is, therefore, of more than passing interest, and we now publish, with only minor abbreviations, a joint report written by Messrs. Chase and Hobday on the inoculation campaign conducted there. It is not suggested that similar measures would be effective in Europe for, as is indicated in this report, foot-and-mouth disease in South Africa shows itself in a particularly mild form, and, furthermore, it is stated that only two types of virus were encountered.

The policy adopted of wholesale immunisation by a fortified virus, introduced intranasally, appears to us to have been a bold one, for in the two outbreaks in the Protectorate no less than a million cattle were inoculated. But, as two years have now elapsed since those operations were completed and as no recurrence of the disease has taken place, results have entirely justified such a policy.

*Bechuanaland Protectorate. The Foot-and-Mouth Disease Inoculation Campaign, 1934. [W. H. Chase, C.B.E., F.R.C.V.S., Chief Veterinary Officer, and J. H. N. Hobday, B.Sc., M.R.C.V.S., Acting Chief Veterinary Officer]. Dated, Mafeking, October 1st, 1935, 14 pp.

HISTORY

In 1893 the disease appeared in much the same mild form in the neighbourhood of the Zambesi River, infection being introduced from the north. The disease spread south and took over two years to reach the south coast where, to quote a report at the time, it "burnt itself out." In 1903 the disease was found in both cattle and sheep introduced into the Cape Colony after the Boer War, for restocking and slaughter, but on this occasion the disease was checked within a few miles of Capetown.

Nothing more was heard of the disease in South Africa until March, 1931, when it was found in Southern Rhodesia and all efforts to trace the source of the infection have failed. From Southern Rhodesia it spread to the Bechuanaland Protectorate where it was first diagnosed in January, 1933, when the intranasal inoculation of virulent blood, discovered by Bevan in Rhodesia, was applied to over 740,000 cattle. Our comment in the *Veterinary Record* at the time was that this was "a remarkable achievement" (*vide Veterinary Record* No. 1, Vol. 14).

The Protectorate remained free from the disease until May, 1934, when the second outbreak, and this time in N'gamiland, occurred. In this instance infection appeared to have been introduced from the adjoining territory on the north-west border, and the virus which was typed at Pirbright was found to differ from that of the previous outbreak.

The present report deals with that outbreak and shows that similar measures to those adopted in the previous outbreak were applied except that the inoculum was composed of virulent blood fortified by lymph or lesion virus or by epithelium surrounding the lesions. An interesting feature of the report on this second outbreak, where the time factor was important, is the extensive use of aerial transport for the landing of officials and virus supplies in outlying districts and the dropping of virus by parachute at inoculation centres in the swamp areas where landing by plane was impossible.

SUMMARY OF 1934 REPORT

Early in May, 1934, foot-and-mouth disease was discovered in a herd of 300 cattle on trek at Sukwane, near Rakops, on the Botletlie River, in the north-west of the Ngwato Reserve. Before the end of the month it was found to have spread from Rakops to Maun in the above area, and was also found in the Ghanzi and Chobe River areas. The oldest centres of

infection were traced to the west of the Okovango Swamps, 60 to 100 miles north of Lake N'gami.

A cordon was established around the infected areas at some considerable distance from the diagnosed centres of infection. A cattle-free belt, 30 to 100 miles wide, separated the cordon from clean territory. Within the cordon, it was decided to apply at once the same measures as in the 1933 outbreak, infecting all cattle by intranasal inoculation, so as to avoid the danger of the disease smouldering and becoming endemic. For cogent reasons, this seemed to be the only method likely to give permanently satisfactory results in the peculiar conditions of the locality. Stock inspectors were sent out to erect crushes at selected sites, and await the arrival of inoculum. Virus was obtained on May 21st, from an infected herd near Makalamebedi, on the Botletlie River, and further supplies were obtained from tests made at Maun, on May 28th.

Inoculation commenced on the Chobe River at Kabullabulla on June 29th, and on the Botletlie River early in July. By the middle of July a sufficient number of crushes had been erected throughout other parts of the infected area to proceed rapidly with the inoculation on a large scale, all supplies of inoculum being issued from the main inoculum production station at Maun. The campaign was completed 20 miles south of Siambisso, on September 4th. The total number of cattle inoculated was 261,774 head.

An aeroplane and three one-and-a-half ton motor lorries were used to distribute inoculum regularly throughout the vast area of 60,000 square miles. Eight landing grounds were prepared, at Rakops, Makalamabedi, Maun, Ghanzi, Tsau, Nokanen, Mohembo, and Kachikau, and a system of dropping inoculum by parachute was instituted to supply the more inaccessible parts, particularly in the swamp area of the Okovango delta. It is estimated that the campaign was shortened by at least two months through the use of the aeroplane. No untoward flying incident took place, in the course of 400 flying hours, in which 86,000 doses of inoculum were delivered at landing grounds and 6,000 by parachute.

For the intranasal inoculations, the inoculum consisted of virulent blood to which was added, to "fortify" it, material containing the virus in much higher concentrations in the shape of vesicle fluid harvested from the epidermal lesions on the tongue of artificially infected cattle. The animals to be inoculated intranasally were driven into a crush, and a dozen native helpers, supplied with suitable twitches, drew the heads to one side by placing the twitches over both jaws, fairly far back, so that the nostrils were left open. The nostrils were raised by lifting the heads, and 2½ c.c. of inoculum dropped into each nostril from a 20 c.c. syringe. The animal was branded on the left cheek with a distinctive sign and then released. In good conditions, with a good team of helpers and a good crush, an electric prodder, and tractable cattle, an inoculator could deal with 1,500 head of cattle a day.

Preparation of Inoculum.—A production station was set up at Maun, an accessible place in the centre of the infected area, and usually 50 to 150 head of cattle were maintained there as virus donors. A suspension of finely macerated lesion material, in 0·5 c.c. dose, was injected under the tongue epithelium to form an obvious bleb. The tongue was examined 24 hours afterwards, for the purpose of harvesting virulent material, which was taken only from the mouth. After withdrawing the tongue, the unbroken vesicles were pricked with a scalpel and the lymph run into a sterile test tube. All free epithelium was excised and the base of the vesicle scraped to obtain the adherent fibrinous matter. These materials were then ground up with sterile sand in a mortar, using as lubricant and diluent a little sterilised preservative fluid (glycerine 12 oz., sodium chloride 8·5 grms., sodium citrate 15 grms., water 1,000 c.c. per Winchester quart bottle). The resulting suspension was either added to virulent blood, to "fortify" it, or used after dilution to inoculate more virus donors. Kept cool and in the dark these stocks of virulent material were found to remain infective for at least seven weeks. Donors of virulent blood were selected, following Bevan's suggestions, from the inoculated cattle which showed pyrexia, either before or at the time when generalised lesions were first seen on the feet or in the mouth. Other symptoms were shown by the general appearance and frequently lachrymation. Large unbroken, tense secondary vesicles were often observed in animals with highly infective blood. At Maun, signs of generalisation were seen from 24 to 96 hours, but usually about the 48th hour, after tongue inoculation. From four to ten litres, depending upon the size of the animal, of blood was withdrawn from the jugular vein of each animal selected as donor. This virulent blood was "fortified" by adding to each 1,250 c.c. run into a Winchester quart bottle (containing preservative liquid as stated above) 5·0 c.c. of the triturated lesion virus. [The concentration of glycerine in the mixture would amount to approximately 15 per cent.—hardly a preservative concentration.] The bottles were then placed in paraffin or petrol cases, with water-soaked packing, and placed in a cool shady place. Delivery was undertaken as soon as possible, and after delivery the bottles were buried in damp shady ground until required for use, which was usually within seven days of issue.

Some Observations upon the Disease.—(*a*) The infectivity of the blood withdrawn from the selected donors was found to vary considerably: the blood from one case might prove highly infective on intranasal inoculation, while from another case showing entirely similar symptoms disappointing results would be obtained. It had been found sometimes also that inoculation of a sample of blood failed to produce lesions on tongue inoculation into cattle. At times, however, samples of blood proved highly virulent and produced infection after intranasal instillation in a shorter period than usual. "Fortification" of the blood by the addition of lesion virus was preferred to mixing the blood withdrawn from several donors. Lesion material, kept in dark glass tubes packed in wet cotton wool, proved still infective after seven weeks, though in three weeks there was considerable reduction in virulence. Passaging did not increase virulence, except in cases where the virus had been stored for some time in preservative fluid; three or four passages then restored the virus to its original virulence.

(*b*) The percentage of cattle that became visibly infected after intranasal inoculation with inoculum prepared as above varied between 10 and 40. A further 10 to 20 per cent. became infected by contact about ten days later. Native stock often seemed more resistant to infection and the effects of the disease than improved stock.

(*c*) Symptoms of infection were usually seen between the eighth and tenth days after intranasal inoculation, more rarely between the fourth and sixth days. Contact infection usually occurred between the tenth and sixteenth days after the original inoculation.

(*d*) Observations on virus donors indicated that the reactions of native cattle to tongue inoculation with the 1934 virus varied in different animals. The degree of variation was fairly constant. Some showed a local reaction only, some a generalised reaction, and some no reaction. Roughly one-third of the total was represented by each class.

Details are given concerning the gradations in severity of the reactions observed after tongue inoculation. [These were, as stated above, very wide; the authors do not mention whether or not, as had been previously significantly indicated by Bevan, these gradations were correlated in some measure with the general bodily condition and age of the animals during the season of the year when the operations were undertaken.] Not all the animals in which generalised lesions arose displayed pyrexia. The average morning (winter) temperature at Maun in the inoculated cattle was at the forty-fourth hour 101·7° F., and at the sixty-eighth hour 102·0° F; in the afternoon, at the forty-eighth hour 104·7° F., and at the seventy-second hour 103·5° F. These compared with average normal temperatures of 100·2° F. in the morning and 101·6° F. in the afternoon. Temperatures above 104° F. (morning) and 107° F. (evening) were rarely registered. The height of pyrexia usually lasted only a few hours. Many cases, it is admitted, suitable for production of blood virus may have been lost overnight or at some time when temperatures were not taken. [Temperatures, it is stated, were taken usually about 11 a.m. and 3 p.m. It would have seemed, in the light of what was known to the authors to be the ephemeral appearance of the pyrexia, which was their rough guide to virus concentration in the blood, that it would have been worth while to record temperatures at intervals throughout each 24 hours while the virus producers were under observation, although it is quite understood that undoubtedly there were grazing difficulties in the way of this being done.] Usually the higher the pyrexia, the more infective was the blood, but this was not always so. Blood from improved cattle usually proved more infective than that taken from native cattle.

(*e*) Cattle which showed signs of having had the disease, such as separation of the hooves and scars of old lesions on the tongue, almost entirely resisted infection by the tongue inoculation, showing at most a slight local reaction. A very small percentage, estimated at less than 1 per cent., which undoubtedly showed signs of having been infected four to six months previously, developed, however, both local and generalised reactions. A change in the immunological type of the virus causing the breakdown may possibly have occurred. If, however, a change in type was responsible, it is difficult to explain why the number of breakdowns should have been so small. Moreover, all animals were not naturally susceptible to the disease.

(*f*) Among unusual cases, a few animals that showed signs of previous infection registered pyrexia about the forty-eighth hour after tongue inoculation, but no generalised lesions developed. One animal showed no local reaction, but pyrexia at the twenty-fourth hour continuing for the next 72 hours, and then lesions were seen on one foot but not in the mouth.

(*g*) At different times clean animals were kept with the virus donors, and it was observed that only 10 to 20 per cent. became infected up to the sixteenth day, and infection in these cases was never recorded before the tenth day. The non-reactors among the contacts were usually used after the sixteenth day for virus production and proved to react in the usual proportion.

In the field natural infection was observed to be slow unless the animals were exposed to some unusual stress, such as trekking; this

shortened the incubation period, increased the amount of infection and the severity of the disease. The trekking of cattle over long distances proved the most important factor in the general spread of the disease, the numerical incidence of cases of infection, the virulence of the virus, and the origin of outbreaks.

(*h*) The actual lesions of foot-and-mouth disease in native cattle in Bechuanaland were indistinguishable from those seen in European cattle in Europe. In the 1933-34 outbreaks in Bechuanaland the disease was mild, the symptoms were not exaggerated, and no deaths occurred. Obvious constitutional symptoms were rarely exhibited. Lameness was rare, except in animals on trek. During wet weather, however, more or less severe lameness, affecting up to 10 per cent. of the cattle in a herd, sometimes occurred, due to the secondary infection of the open foot lesions. Rumination was not usually suspended, even when there were extensive lesions in the mouth. A sweet necrotic odour was perceived in a kraal containing badly infected cattle. Native owners generally failed to recognise anything amiss among their cattle when even 30 to 50 per cent. were infected. The only sequel observed was separation of the hooves, which was of no consequence and served to estimate the time which had passed since infection. Separation was most common in the front of the claws and at the heels. Casting of the hoof was not observed. Normal cattle which have walked over hot burnt veldt often show lameness and extensive separation at the heels, but no mouth lesions are seen in these cases.

Experimental Work.—(i) Spraying the heads of cattle with inoculum failed to set up infection, and the animals afterwards reacted on test in the usual proportions. This method could not therefore be employed as a substitute for intranasal instillation.

(ii) Inoculation of lesion virus into the subjacent tissues of the epidermis of the interclavian cleft proved as effective as the tongue inoculation.

(iii) Intravenous inoculation proved less certain than the tongue inoculation.

(iv) The saliva and mouth scrapings were found active on the sixth day after generalisation, but not on the twelfth day. Neither blood nor foot lesion scrapings proved infective when taken on the sixth and twelfth days.

(v) Native sheep and goats have not been found susceptible to natural infection. Of two goats and two sheep inoculated into the tongue with a rich inoculum, one sheep and one goat showed a local reaction and the sheep developed a secondary lesion on the dorsum of the tongue. No pyrexia or other lesions were recorded.

Origin of the Outbreak.—This was never definitely traced. The earliest infections were discovered about 80 miles north of Lake N'gami, which suggests that infection originated in the extreme north-west of the Territory, and travelled southwards through cattle movements. The infection was introduced most probably, therefore, through the northern border, for active disease existed in Barotseland, about 250 miles north of Lake N'gami. It is assumed that the outbreak did not originate from the 1933 outbreak, for the following reasons:—

(i) According to the results of tests carried out at the Foot-and-Mouth Disease Research Committee's Experimental Station at Pirbright, England, the virus of the 1933 outbreak was a variant of the "O" type, while that of the 1934 outbreak was of a different type.

(ii) Although it is possible that some mutation of the 1933 type had occurred, it has to be recognised that 375 miles of territory populated with cattle separated the 1933 outbreak from the earliest centres of infection in the 1934 outbreak. Moreover, the disease was occurring in neighbouring countries at this time. Late in May, an outbreak occurred at Kazangula, Northern Rhodesia, amongst 1,800 head of cattle which had been moved across the Zambesi River from an area of the Bechuanaland Protectorate in March. Early in July an isolated outbreak was reported from Southern Rhodesia, on the Nuanetsi Ranch, in a herd of 600 head, and in October, Lusaka, in Northern Rhodesia, and Gobabis, in South-West Africa, became infected. Subsidiary outbreaks to the July outbreak occurred in Southern Rhodesia.

The only uncontrolled extension of the disease in the Bechuanaland Protectorate occurred in August, at Rakops, where it jumped the cordon and appeared 30 miles east of it. This necessitated laying down a loop cordon, and the inoculation of a further 30,000 head of cattle.

Previous to these outbreaks in 1934, the disease occurred in Southern Rhodesia in 1931, when inoculation was first undertaken to eradicate it. Early in 1933 the Bechuanaland Protectorate became infected, and there was a small outbreak in the Transvaal and also in Cape Province. Inoculation within a cordon in the foremost case and slaughter and strict quarantine in the latter cases succeeded in checking the spread of the disease. In August, 1933, an outbreak occurred in the Bechuanaland Protectorate, on the Baralong Farms, five months after inoculation, and was assumed to be due to infection remaining alive through a chain of cases in animals which did not react to the inoculation. In 1933 an outbreak in Barotseland, Northern Rhodesia, was dealt with by inoculation.

Between 1931 and 1935, therefore, the disease has been widely distributed over Central Southern Africa. Reports from England have indicated that the type of virus occurring in

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THE LESSONS OF VETERINARY RESEARCH IN AFRICA

WE would commend to the close attention of our readers the notice which we publish in this issue of a report of recent Conferences on Co-ordination of Research, Medical and Veterinary, in East Africa. The issues raised have a topical significance for the veterinarian which extends well beyond the geographical limits of the territories for which, as the result of the discussions of the delegates to the conferences, what seems to us to be an admirable solution of a special problem in research organisation is offered. It is a matter for congratulation that these discussions took place among both medical and veterinary workers in the territories, in an atmosphere of felicitous harmony; and, while much that was common ground between the two sets of workers was revealed, it soon became evident that solution of the most pressing problems in veterinary research was to be achieved most efficiently by adopting a system of centralised organisation which of necessity cannot be resorted to in the investigation of diseases of the human subject. This simple solution, which commends itself at once to anyone with experience in veterinary research, is indeed similar in its intent to that contained in the recommendations of the Lovat Report (1929) on recruitment and organisation of the veterinary services in the non-self-governing dependencies. That Report, it will be recalled, recommended the appointment of a veterinary adviser to the Colonial Office, the creation of a post-graduate school in tropical veterinary science in London, the organisation of the Kabete Laboratory, in Kenya, as a "feeder" station for veterinary research, and a system of scholarships at the veterinary colleges for the initial training of selected candidates. The Report, moreover, represents one of the most remarkable documents published in recent times defining the scope of utility of the veterinarian and the essentials for his proper training for overseas service. Likewise, we cannot withhold our admiration for the range of vision exhibited by the delegates to the conferences whose report is the subject of present review. It has become increasingly evident that there is a more or less well-marked delimitation of the main problems of veterinary research corresponding to large territorial divisions. It is made clear in the report that the investigational problems to be attacked in South Africa have come to differ considerably from those which present themselves in the several countries lying further north, in the more tropical regions of Africa. In these countries there is a very large measure of homogeneity in the disease problems affecting livestock and it would be a dissipation of veterinary enterprise not to concert measures for their solution within the widest limits geographical in their similarity. It could be argued, with much reason, that veterinary research problems elsewhere in the world also show peculiarities that are differentially related to certain wide territorial limitations. Hence, if we select at random the half-dozen most important livestock diseases of Western Europe (and more especially Great Britain), North America, South America, and the Near and Far East, we soon find that the dissimilarity in their identity and likely mode of effective control in these several territories offers great variety of experience to the skilled veterinarian. It results that workers whose training and experience have been confined to the investigation of livestock disease in one region are not necessarily skilled in the particular problems of another region. Not long ago, in the years before the Great War, the instruction given at the Royal Veterinary College under the Principalship of Sir John M'Fadyean, in his ordinary and post-graduate classes, presented an attempt to convey authoritatively what may be described as world-wide information upon animal pathology. Rapid expansion in several aspects of technical knowledge and the necessarily restricted range of first-hand experience of the younger school of

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the Southern Rhodesia outbreak of 1933 and in the Bechuanaland outbreak of 1933 were similar, whilst the Southern Rhodesia virus of 1934 and the Bechuanaland Protectorate virus of 1934 differed from each other and from the 1933 type.

The Effect of the Campaign.—Extensive cattle movements under veterinary supervision have since taken place from the inoculated area through and into uninfected areas, and no recurrence of the disease has been reported. This indicates that "carriers" of foot-and-mouth disease did not exist in the circumstances obtaining in Bechuanaland. The campaign also served to establish greater contact with distant parts of the territory, demonstrated the use of the aeroplane in these parts, and a cattle census of the area, which was previously not available, was obtained. In Bechuanaland the disease was not a menace to native cattle. No mortality or serious consequences resulted, and from the point of view of the importance of the disease in itself it might have been disregarded, save that it was necessary to prevent its spread to other countries, where its effects might have proved more damaging.

workers who undertake the teaching of the subjects of veterinary pathology have rendered impossible the continuation of such an endeavour, and in the matter of tropical veterinary pathology there has been of recent years, it is feared, a sad depreciation in the standard of training. As a country with immense overseas interests, in which the field for the useful employment of the properly trained veterinarian is almost unlimited, we would like to press to the notice of official authorities the implications of the Report under review and again urge that the recommendations of the Lovat Report be adopted immediately in their entirety. The present Secretary of State for the Colonies was, happily, a member of the Committee which drafted that Report, and on numerous occasions he has given evidence that he is fully alive to the immense importance of the veterinary services overseas. We trust that with the improvement in the financial situation he will not delay the introduction of the measures which are necessary to strengthen these services. Finally, we would like to endorse the comments of our reviewer on the state of veterinary research at home: certainly, as he says, all is not well with it as it is organised at present.

AGRICULTURAL SCIENTIFIC RESEARCH: CONFERENCE OPENED IN LONDON

A scientific conference, attended by representatives of the Governments of the British Commonwealth, was opened in London on Monday by Mr. Elliot, Minister of Agriculture.

The chief function of the conference is to examine the work and future of a number of scientific organisations established on a co-operative basis to perform a common service in various branches of agricultural scientific research.

It has been previously announced in this journal that, as a result of the Imperial Agricultural Research Conference of 1927, the Governments of the Empire agreed to establish bureaux of centres of information in eight branches of agricultural science, financed by contributions from all parts and controlled by a council representative of all parts of the Empire. To these the supervision of two older institutes was added in 1933, on the recommendation of the Imperial Committee on Imperial Economic Consultation and Co-operation.

The future of certain research schemes to which several parts of the Empire now contribute, and further methods of the interchange of information and closer collaboration in scientific work was also considered by the conference.

After the opening meeting the conference went on tour, inspecting bureaux and centres of information dealing with agricultural scientific research, and will reassemble in London on October 2nd. On October 7th the delegates will be entertained by the Government at a dinner, over which Mr. Ormsby-Gore, Secretary of State for the Colonies, will preside.

Report

CONFERENCES ON CO-ORDINATION OF RESEARCH IN EAST AFRICA*

For some years past, it has been evident that co-ordination of much of the research in East African territories would be followed by more wide-reaching results than are possible under present conditions. Each colony has endeavoured, in the past, to build up a research organisation suitable for its needs. At Kabete (Kenya), Entebbe (Uganda), Mpapwa (Tanganyika) and Mazabuka (Northern Rhodesia), well-equipped laboratories for veterinary research are to be found. The one at Kabete is of considerable size and has, from time to time, investigated problems common to neighbouring territories. The maintenance of the stations is no small item in the expenses account of any colony. Of late years, the financial situation has been responsible for a lessening of the work possible at individual stations; that at Mazabuka has practically ceased, and the main endeavour has been the continuance of local and routine operations such as diagnoses, preparation of vaccines and the like. Work on major problems has had to be postponed. Some years ago, the Hilton Young Commission recommended that a general survey of the research work of the colonies in East Africa should be made with a view to ascertaining what problems should be considered as purely local and those which might, with advantage, be investigated at a common centre. Eventually, a small committee reviewed the position, and, in 1932, the Governors' Conference agreed that it would be desirable to consider whether the recommendations of the committee could be implemented. Presumably, financial conditions were responsible for the delay. In January of this year, three conferences were held of technical officers of certain of the territories. These officers were from the medical and veterinary departments and met as one body to discuss trypanosomiasis and separately, to discuss matters peculiar to each branch of medical science.

Before dealing with the conference with which readers of the *Record* are more particularly interested, one thing, which cannot but be described as regrettable, must be mentioned.

*Conferences of Governors of British East African Territories: (*a*) Conference on Co-ordination of General Medical Research in East African Territories (Nairobi, 1936); (*b*) Conference on Co-ordination of Veterinary Research in East African Territories (Kabete, 1936); and (*c*) Conference on Co-ordination of Tsetse and Trypanosomiases (Animal and Human) Research in East African Territories (Entebbe, 1936).

"Science knows no borders" is a hackneyed, but true, saying. That this is recognised by those responsible for the conference is proved by the presence of representatives from the Sudan and the Belgian Congo. The former is not, administratively, an East African colony; indeed, it is a con-Dominion administered by the Foreign Office. On the other hand, both Nyasaland and Northern Rhodesia are under the control of that section of the Colonial Office which deals with East Africa, yet neither was represented. Whatever the reason, this is, scientifically, a matter for regret. The report states :—

> "The East African territories, with the inclusion of the Sudan, form a homogeneous natural group in respect of their stock disease problems. . . . On the whole, it was felt that development had removed South Africa from the tropical group so far as stock diseases were concerned."

That being so, it is not understood why two territories, which are allied to Central and East Africa, rather than South Africa, so far as many of the stock diseases are concerned, remained unrepresented, especially as trypanosomiasis, a disease of vital importance to both, was to be discussed.

That the question of co-ordination of research had been given careful consideration is proved by the unanimity shown by the speakers. It is to be assumed that each was speaking with the approval of his Government and it is a matter for congratulation that all agreed that the conversion of the Kabete laboratory into a central one will be in the best interests of the territories concerned. At such a centre, the more wide range problems could be investigated with a promise of continuity and adequate staff not now possible in individual colonies. The elimination of such diseases as rinderpest, coast fever, rabies, and the like, calls urgently for information not yet available. The preparation of vaccines which do not require to be made locally can be undertaken at a lowered cost. Naturally, each representative stressed the necessity of smaller, local laboratories for routine work. It was the function of the conference merely to decide upon the principle; details as to the manner in which the agreed co-ordination should be brought about were left to a committee appointed *ad hoc*.

All interested in the progress of veterinary science will rejoice at the decision taken. In Africa, there are many vital problems operating against the advancement of the stock industry, and new ones are so constantly arising that combined and continued effort is essential if further progress is to be made. Such effort was commenced in South Africa many years ago and it is doubtful if any body in the Union has contributed more than the staff at Onderstepoort to that development of the Dominion which the riches of the Rand have made financially possible. There can now be envisaged in Africa, two institutions, one in the south and the other further north, each working on the problems indicated by its geographical situation and each, it is hoped, in that close liaison with the other which is essential for success. The veterinary profession has done much for Africa; it has much more to do and it is setting about its task in a proper manner. The writer yields to none in his admiration for the investigations being carried out in the United Kingdom, and especially so since, during the past few months, he has been brought more intimately in contact with them. He cannot, however, but deplore the fact that there are so many institutions, controlled by so many varying bodies, engaged in the work. Promotions, removals of staff, financial difficulties, and so on, are all tending to delay and defeat work which is of vital importance. If the example of Africa could be followed at home, if the best men engaged in investigational work could be brought together, if the work of each could be seen and helpfully criticised, by all, we should soon hear less complaints of the position held by veterinary surgeons in the scientific world.

Having settled the momentous question, the delegates proceeded to discuss the position in regard to the various diseases with which they are confronted and to report progress regarding such investigations as are in being. The details given should be read by all in the profession.

The question of the co-ordination of medical research was discussed by the medical delegates amongst whom, it is interesting to note, was one from Nyasaland. The position regarding medical research is somewhat different from that in connection with stock diseases. Disease cannot be induced in man, as in animals, at any place suitable for investigations and many of the delegates appeared to fear, and rightly so, that the divorce of research from hospitals would not be in the best interests of all. In countries of vast areas and sparse population, the establishment of a large central hospital would be more than prejudiced by the difficulties of transport of patients, even though the aeroplane is becoming of steadily increasing importance in this respect. Consideration of the subject, however, resulted in a decision that the possibility of long range problems being investigated by an amalgamation of medical laboratories should be examined by a committee. This will, if such is considered practicable, put forward the details of a scheme. The possibility of studying certain problems at a central station, where the initial work may have to be carried out upon animals, may result in the creation of a station for that purpose. If this can be sited adjoining the veterinary one, much

helpful co-operation would follow. The medical conference also discussed diseases of interest to the territories the members represented.

At the close of the two conferences dealt with above, a third one, attended by both medical and veterinary delegates, was commenced to discuss the results of the work in progress on trypanosomiasis. As is well known, this work was, to a great extent, co-ordinated some years ago and all engaged in it are in the closest liaison. It is impossible to review the work in the space available for a review, for the report is packed with important details regarding the present position.

The importance of these conferences cannot be overstressed and particularly that of the veterinarians. A momentous decision has been made. Naturally, it will be some time before details are settled and financial provision made. The fact cannot be lost sight of, however, that the authorities have realised the importance of the work undertaken by the veterinary departments and the necessity for furthering that work in every way. Those who have worked for the end which now appears to be in sight, have good reason to congratulate themselves.

J. S.

SYNTHESIS OF VITAMIN B_1 (ANTINEURIN)

"Since the realisation that the molecule of vitamin B_1 contains two heterocyclic rings, a substituted pyrimidine and a substituted thiazole, intensive research has been directed towards establishing the positions of the substituent groups and the method of combination of the two rings," asserts *Nature*. "Professor Williams and his collaborators at Columbia University have now succeeded in isolating a compound which is chemically and physiologically identical with the natural vitamin. Several groups of workers in Great Britain and Germany have been working at the same problem, but they will doubtless be among the first to congratulate the American chemists concerned on a brilliant and important piece of organic synthesis. It may be noted that this achievement means that, with the syntheses of ascorbic acid, lactoflavin, vitamin D and vitamin B_1, four vitamins have now been produced from completely inactive organic reagents by purely chemical means."

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Queensland statistics show that for the year 1934 to 1935 there were only two cases of known human infection with the bovine type of tubercle bacillus amongst nearly 400,000 of the young people of the State between birth and the age of 21 years—two cases in 400,000 in twelve months. —*Brisbane Telegraph.*

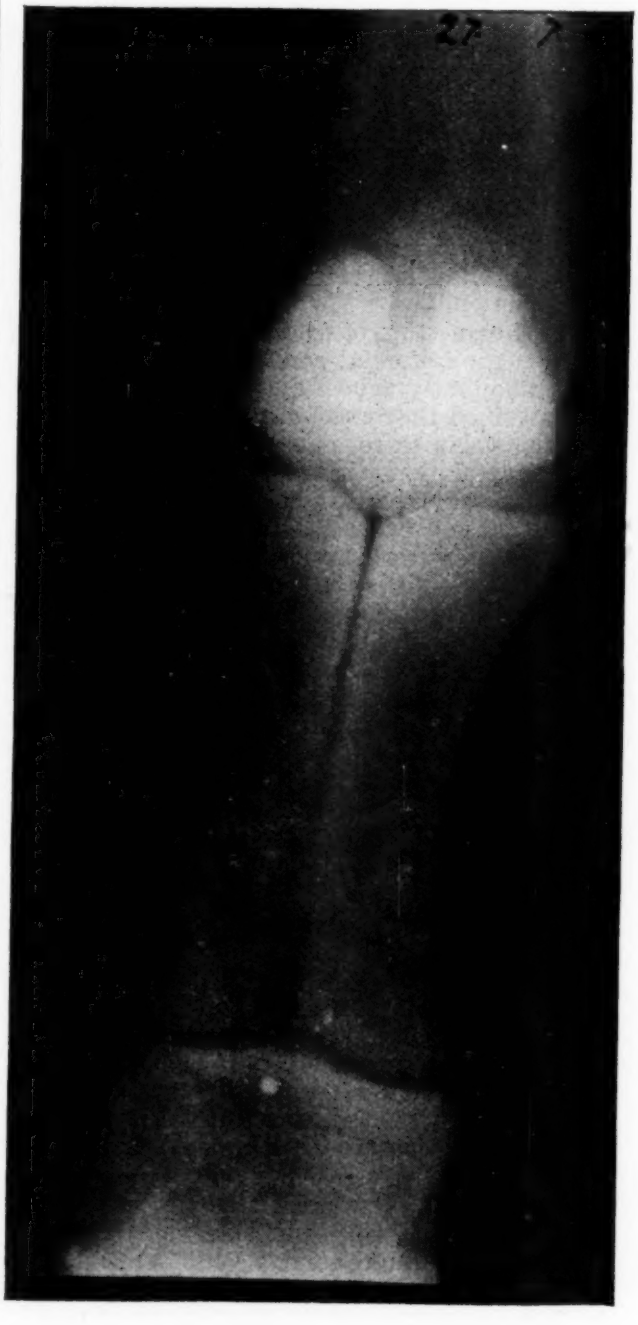
Clinical Communication

AN INTERESTING CASE OF SPLIT PASTERN

K. A. MILES, M.R.C.V.S.
Market Harborough

Subject.—A nine-year-old hunter mare.

Examination and Course.—The mare was galloping loose in a field, when she fractured this bone, the off fore os suffraginis. Diagnosis was a starred pastern bone, as no crepitation could be detected, and the owner did not want an X-ray photo taken.



Abstracts

[**Observations upon Some Aspects of Horse Breeding.** Williams, W. L. (1936.) *Vet. J.* **92.** 4. 119-126. (4 tables, 5 refs.).]

From an examination of the breeding records over a number of years of Percheron and Belgian mares and stallions belonging to the New York State College, the author has been able to draw certain conclusions which may be briefly summarised as follows:—

A wide variation in the ratio of conceptions to the number of services was found to exist and fillies bred for the first time at three to three-and-a-half years gave the highest percentage of pregnancies which terminated in viable foals. The average duration of gestation was 333 days for mares and 337 days for fillies, and the author came to the conclusion that abbreviated or prolonged gestation indicates subnormal health in both mother and young. A study of the influence of the time of conception on reproductive vigour showed that the number of conceptions following service at the first oestrus *post-partum* is definitely lower than that among mares which conceived in later oestral periods. Moreover, the ratio of non-viable foals from conceptions in the first oestral period *post-partum* is double that observed in foals from mares which had conceived at from 16 to 99 days. Finally, the importance is stressed of using a stallion whose semen contains few spermatozoa abnormal in their morphology, and there is now no doubt that the fertility of stallions may be established by an examination of their spermatozoa.

J. A. N.

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[**Infectious Laryngo-enteritis of Cats.** Krembs, J., and Seifried, O. (1936.) *Arch. wiss. prakt. Tierheilk.* **70.** 4. 259-277. (2 tables, 9 figs., 5 refs.).]

The authors describe an infectious disease of cats which has recently made its appearance in Germany. The disease attacks animals of all ages and both sexes and is characterised by a catarrhal diphtheritic laryngitis, tonsillitis and gastro-enteritis. The clinical symptoms are anorexia, vomition, intense thirst, raised temperature and death in three to four days, the affected animal passing into a state of profound coma shortly before death. The incubation period is seven to eight days. On *post-mortem* examination, inflammation of the tonsils and pharynx with reddish or greyish-white diphtheritic deposits on the epiglottis and peri-pharyngeal tissue was seen. In 50 per cent. of the cases examined, trachitis with diphtheritic deposits on the mucous membrane was present. The mucous membrane of the stomach and intestines was thickened, the most pronounced changes always being found in the ileum. Here the mucous membrane was swollen and greyish-white in colour in the early stages of the disease, later it became intensely injected. There was enlargement of the spleen in all cases, and in some cases small necrotic areas were present in the liver. The authors consider that the symptoms, incidence and *post-mortem* changes are sufficient to differentiate this disease from cat distemper, infectious gastro-enteritis or cat diphtheria.

J. A. N.

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[**Treatment of Faeces for Examination for Tubercle Bacilli without Lowering the Vitality of the Organism.** Eickmann and Schopen. (1935.) *Deuts. tierärztl. Wschr.* **43.** 7. 97-99.]

A method for the recovery of tubercle bacilli from faeces and for the destruction of saprophytic organisms is described. The authors show that by treating faeces with potassium dichromate solution (1:250) for 20 hours the vitality of tubercle bacilli is unaffected, whereas out of 24 samples of faeces containing tubercle bacilli, in only nine could they be recovered after treating the sample with 15 per cent. antiformin for two to three hours. The method employed for the examination of faeces is as follows: About 5 gms. are mixed with 30 c.c. of a 1:250 aqueous solution of potassium dichromate and allowed to stand for 20 hours with occasional shaking. The mixture is then centrifuged for 15 minutes and the deposit washed with saline and inoculated into guinea-pigs.

S. J. E.

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[**The Elimination by Rabbits and Poultry of the Bacteria causing Enteritis.** Borcila, J. (1934.) *Deuts. tierärztl. Wschr.* **42.** 50. 802-804. (1 table, 22 refs.).]

In natural cases of enteric disease the causative organism can usually be isolated from the faeces (this is not strictly true, *see* Francke, G.,

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Treatment consisted of plaster bandages, and the animal put in slings for six weeks.

Three months after the injury the X-ray photo was taken, as the mare was still slightly lame. I think the lameness was caused by the callus on the articular surfaces of the pastern bone. To me the photo is very interesting, as it shows a dead central longitudinal split in the bone, a very uncommon fracture of this particular bone. I am indebted to Mr. R. J. Walls, of Stanley Road, West Bridgford, Nottingham, for the excellent photo.

The mare is now out at grass, in the hope that exercise will cure the lameness.

et alia below), while the titre of the animal's serum may reach 1 : 2,000.

The author suggests that there must be predisposing causes before these diseases can arise, basing his conclusions on the fact that he failed to cause illness in rabbits with *S. enteritidis* or *S. typhi-murium*, whether administered by stomach tube or by subcutaneous injection, or in poultry by the administration of *S. enteritidis* or *S. pullorum*. Blood and faecal cultures were uniformly negative, as were cultures from the viscera after death, the only evidence of infection being the presence of agglutinins in the blood to low titre on some occasions. All the experimental animals were killed and eaten without apparent harmful effect.

Mixtures of *Bact. coli* and the paratyphoid bacilli were examined after 24 hours' incubation and no paratyphoid bacilli were recovered, hence the theory is advanced that *Bact. coli* inhibits the establishment of the infective organisms in the intestines. P. S. W.

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[The Resistance of Cattle to Intestinal Infection together with more General Observations. Francke, G., Standfuss, R., and Wilkin, H. (1934.) *Berl. tierärztl. Wschr.* **50.** 46. 753-759. (2 refs.).]

The importance of paratyphoid conditions in cattle is two-fold: firstly the infection of milk and hence outbreaks of "food poisoning" in humans, and secondly the spread of the disease in the form of an epidemic. Owing to the risk of infection occurring in human beings the German Government issued regulations which are summarised in the first part of this article.

The second part gives the detailed protocols of an investigation carried out by the authors on 43 outbreaks of disease in the Potsdam district. This was spread over a period of four years (1930-34) and included the examination of 1,717 animals by serological methods and by cultural examination of faeces.

Though all cases are of importance from the public health point of view, the authors point out that a considerable proportion (16 of their series of outbreaks) are not epidemics but merely isolated instances of infection and hence of less importance from the veterinary angle. This type of outbreak is more difficult to detect and is usually found by the meat inspector.

It appears that *S. enteritidis* var. dublin (*B. ent.* Gärtner var. Jensen) was the causal organism in the majority of the outbreaks (25 out of 43); most of the others (eleven) were due to *S. typhi-murium* (*Bact. aertrycke*), while a few were caused by *S. enteritidis* var. rostock (Gärtner-Poppe Bakterien). One of the latter was especially to be noted for its severity.

The finding of *S. enteritidis* var. dublin as the cause in the greatest number of instances is in accord with the usual reports, while it is to be noted that though 411 animals were examined for *S. typhi-murium*, this organism was never recovered from the faeces. P. S. W.

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[Colibacillosis of Calves.* Lovell, R.]

Bact. coli is responsible for a large proportion of deaths among calves during their first week or so of life, the typical syndrome being known as "white scours." Of 100 calves collected at random and examined shortly after death, *Bact. coli* was responsible for death in 37 and involved in six further cases. All strains examined were indol +, M.R. +, V.P. −, Eijkman +, citrate −, and failed to liquefy gelatin.

Certain strains showed a rapid mutation when grown on agar for several days, a grey-translucent growth appearing at the periphery of the parent opaque mucoid colony. Mucoid colonies consist largely of capsulated bacteria, which are not agglutinated in buffer mixtures of lactic acid and sodium lactate (*p*H 4·8 to 2·4) and are agglutinated to low titre by homologous serum. Grey-translucent mutants consist largely of non-capsulated bacteria, which are agglutinated in buffer mixtures of lactic acid and sodium lactate and agglutinated to high titre by homologous and some heterologous sera also. By using mucoid strains both for producing immune sera and for agglutinating suspensions, specific reactions are produced.

A carbohydrate extract, soluble in water, giving positive Molisch and negative Millon reactions, can be prepared from both variants by preliminary alkali extraction at 70°C.; that prepared from mucoid strains is specific by the precipitin test, whilst that from grey-mutants is apparently less specific and less in quantity. The precipitin method, using extracts and sera prepared by injection of whole cultures, is being applied in an attempt to identify those strains of *Bact. coli* which are capable of producing disease in calves. It is also applicable for strains which do not show the rapid mutation. The main object is to determine whether special races of *Bact. coli* produce white scours in calves and, if so, to what extent.

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[Recent Studies on Botulism.* Meyer, K. F.]

During the past five years the following significant contributions have been made to botulism:—

(1) Botulism—single and group-infections—has increased in the United States and Canada. Two hundred and sixty-one outbreaks (794 cases, 517 deaths) were chiefly due to inadequately preserved home-canned vegetables,

*Abstracts of communications made to the Second International Congress for Microbiology, London, July 25th-August 1st, 1936.

several cases to soya bean mash or cheese fermented in the soil. Fish is the chief botulinogenic food in U.S.S.R. [Tables were shown giving the incidence in U.S.A. and the regional world distribution of types.]

(2) Fruit and vegetables preserved by freezing cause no botulism if carefully handled before freezing and consumed directly after thawing.

(3) Differences between *Cl. botulinum* and *Cl. parabotulinum*: *Cl. parabotulinum*, the common organism in human outbreaks, especially in the United States, is strongly proteolytic, has very heat-resistant spores, is easily isolated, and produces Toxin Type A or B. *Cl. botulinum* (van Ermengem) is hardly proteolytic, has poorly heat-resistant spores, is difficult to isolate, and produces Toxin Type B, C or D.

(4) Three strains recently obtained from U.S.S.R. resemble *Cl. botulinum*, but their toxin differs from the four known types.

(5) "Duck Sickness" in the Western United States is due to *Cl. botulinum* Type C, botulism in wild fowl in Australia to *Cl. botulinum* Type C β.

(6) The agglutination reactions of 160 strains were investigated by McClunn. The sub-groups established by Schoenholz and Meyer depend solely upon the thermo-labile antigen. All parabotulinum strains possessed the same thermostable antigen. No cross-agglutination occurred between *Cl. botulinum* and *Cl. parabotulinum*.

(7) Synthetic media: Toxin is stated to be produced by *Cl. parabotulinum* in biuret-free media (Tani). Growth is stimulated by tryptophane and cystin (Burrows) or "Sporogenes vitamin" (Fildes).

(8) A new method is described for purifying botulinus toxin, giving a mouse M.L.D. of 4 to 8×10^{-9} gm.

(9) There is a high incidence of botulism in U.S.S.R. The death-rate of 146 cases receiving antitoxin was 18, that of 76 untreated cases 93 per cent. (Velikanow and Kolesnikova).

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[**The Rôle of Clostridium welchii and other Anaerobes in Disease of Sheep.*** Bosworth, T. J.]

Interest in the common pathogenic anaerobes is largely centred at present on their relationship to disease in animals. *Cl. welchii* is of much greater importance in this connection than was previously suspected. Many rapidly fatal cases of illness in sheep are due to intoxication by the toxins produced in the intestine by various types of this organism, which differ from one another in the antigenic character of their toxins (Wilsdon). The relationship of these organisms to one another and to the classical type of *Cl. welchii* (*B. perfringens*) is now understood. Thus it has become possible to immunise animals against the entire group. Application of this procedure to man might be considered. Type A is not the only member widely distributed in nature. Although the other types which are more potent toxin producers have not been isolated from human lesions, the possibility of their gaining access to the body through wounds or otherwise cannot be disregarded.

The conditions favouring the onset of enterotoxaemia in sheep require further investigation. Besides its scientific interest, this problem has considerable economic importance, since probably *Cl. welchii* causes a greater wastage of animal life in this country than any other anaerobe.

Other important diseases of this class met with in Great Britain are blackleg and braxy. The aetiology of the former is still controversial. The weight of opinion is to the effect that it is a specific disease caused by *Cl. chauvoei*. Quite apart from other considerations, the continued success of the use of preventive vaccines prepared from this particular organism affords strong confirmatory evidence in favour of this view.

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[**Pathogenic Anaerobic Bacteria.*** Borthwick, Miss G. R.]

(1) *Factors Influencing the Occurrence of Infection from the Alimentary Tract.*

In infection of guinea-pigs by the enteral administration of *Vibrion septique*, the hydrogen-ion concentration of the gastro-intestinal contents and the local application of cold to the alimentary mucosa have little effect. Stasis and generalised chilling, on the other hand, predispose to infection. *B. ovitoxicus* fed to sheep produces infection only in association with reduced peristalsis and an alkaline reaction of the gastric contents.

Toxaemia is not produced by the enteral administration of *Vibrion septique* toxin to guinea-pigs and *B. ovitoxicus* toxin to sheep under any of the conditions studied in the production of infection.

(2) *The Toxins of the* B. welchii *Group.*

Observations on the toxins of the *B. welchii* group confirm the classification of *B. welchii* strains into the now accepted types, A, B, C and D, according to their serological characters. Except for the similarity between the toxins of type C and *B. oedematiens*, there is no relationship between these toxins, A, B, C and D, and the toxins of certain other members of the anaerobic group. The monovalent character (A) of commercial *B. welchii* antitoxin was demonstrated. A general parallelism between the antitoxic and anti-infective properties of *B. welchii* sera was shown. A striking exception, however, is that type A and commercial antisera protect against infection by type D organisms.

Local Authority Report

COUNTY COUNCIL OF DURHAM

Veterinary Department

REPORT OF THE CHIEF VETERINARY OFFICER FOR THE YEAR 1935

The above report issued by H. Birkett Allan, Esq., M.R.C.V.S., D.V.S.M., records another year of wide and useful activity on the part of the Durham County Veterinary Staff.

The county is divided into four districts, each in charge of a veterinary officer, while a panel of practitioners is available for emergency duty in each area. Each veterinary officer is furnished with appropriate laboratory equipment for the personal examination of samples of milk, sputum, etc., collected by him, and at headquarters a more highly equipped laboratory is provided. During the year 1,813 samples, including 1,125 of milk and 430 of sputum, of which 353 (including 117 of milk and 174 of sputum) proved positive, were examined by the veterinary staff. Biological examinations are carried out by the Public Health Laboratory, Newcastle-on-Tyne.

During the year 23 notifications of tuberculous milk samples taken by authorities within and outside the county area, and by Food and Drugs Inspectors of the county council were received and dealt with by the veterinary staff. In 16 of these cases the animals responsible for the infection were traced and dealt with under the Tuberculosis Order; in five cases the responsible animals had been removed from the farm prior to the visit of the veterinary officer; while in the remaining two cases control samples of milk proved negative and showed that the source of the infection had, at the time, ceased to exist. A table is given showing the number of these notifications received during the last six years and the results of the consequent investigations.

The report shows that there were twelve "Certified" herds and one Grade "A" (T.T.) herd in the county during the year. By the end of the year the number of Grade "A" herds had increased from 30 to 164. As from August 1st, 1935, the examination of these latter herds was carried out by the county staff without charge to the owners. In this connection 422 visits were paid to farms, 7,932 cows were examined and 216 cows affected with scheduled pathological conditions were found. Of these, six were affected with tuberculosis of the udder and 17 with other forms of tuberculosis.

Routine examinations of non-graded herds were carried out during the year by the veterinary staff. These examinations involved 4,965 visits to farms, during which 51,039 cows were examined, of which 89 were found to be affected with tuberculosis of the udder, 115 with other forms of tuberculosis, 822 with mastitis and 355 with other conditions detrimental to the purity of the milk supply. The county veterinary staff enjoy the confidence of milk producers and the educative value of these visits is considerable. By collaboration with local sanitary inspectors the veterinary staff has been the means of effecting a marked improvement in the hygienic conditions of cowsheds and dairies in the county area.

The section of the report dealing with the examination of dairy herds concludes with a summary of the reports by the district veterinary officers on the condition of cows and buildings in each sanitary district of the county.

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The second part of the report deals with work carried out under the Diseases of Animals Acts.

During the year 33 suspected cases of anthrax were reported, of which five were confirmed, the source of infection in each case being thought to be artificial manure. For the fourth successive year no case of foot-and-mouth disease occurred in the county. Six suspected cases of parasitic mange were reported, of which four were confirmed, the outbreaks occurring among pit ponies. Veterinary examination of 300 contact ponies revealed the presence of parasitic mange in 32 animals, all of which were successfully treated by the practitioners in attendance.

The number of outbreaks of sheep scab showed a sharp rise to 30 as compared with eight during the previous year, and 156 sheep were found to be affected. Of the 30 outbreaks, 15 were due to sheep imported from the areas of other local authorities.

During the year 202 suspected cases of swine fever were reported, of which ten were confirmed and dealt with by the veterinary staff of the Ministry of Agriculture.

Under the Tuberculosis Order, suspected cases were notified on 397 farms, at which 9,483 animals were examined. The disease was confirmed on 350 farms and 382 animals were dealt with by slaughter. Of this number, 227 were discovered during examination of herds by the veterinary staff, including 95 animals affected with tuberculosis of the udder or giving tuberculous milk, three animals affected with tuberculous emaciation and 129 affected with other forms of tuberculosis; and *post-mortem* examination showed that 154 of these were affected with advanced and 73 with not-advanced tuberculosis. The remaining 155 cases were reported, and included 32 animals affected with tuberculosis of the udder or giving tuberculous milk, two affected with tuberculous emaciation and 121 with other forms of tuberculosis; and

post-mortem examination showed 120 of these to be affected with advanced and 35 with not-advanced tuberculosis.

Total compensation paid to owners amounted to £1,186, an average of £4 18s. 9d. per animal slaughtered. Income from salvage was £286 10s. All carcases are disposed of at knackers' yards at a flat rate of 15s. per animal.

Records of cases of contagious abortion are being kept by the veterinary officers, and during the year the disease was noted as affecting 65 cows on 53 farms. This incidence appears extraordinarily low as compared with other areas.

Inspections at markets numbered 163 and over 41,000 animals were examined, but only one animal was removed from market on account of clinical tuberculosis.

It is pleasing to note that the county veterinary officers are from time to time consulted by meat inspectors in the county and that tuberculous animals slaughtered in the county slaughterhouses are notified to the veterinary staff.

The half-yearly tuberculin test of the herd owned by the County Agricultural Committee at their Experimental Farm was carried out and five reactors were removed from that herd.

A joint committee composed of members of the Durham Branch, N.F.U., the North of England Veterinary Medical Association and the County Veterinary Department has been formed to administer a voluntary scheme for the establishment of tubercle-free herds. The results of the activities of that committee will be awaited with much interest.

The county veterinary staff is responsible for the examination of the herds of approximately 300 producers supplying milk to schools under the "Milk in Schools" Scheme of the Milk Marketing Board.

The county veterinary staff advises in connection with Poultry Centres established under the county council's Land Settlement Scheme and carries out *post-mortem* examinations of diseased or dead birds.

The veterinary officers are inspecting officers under the Performing Animals (Regulation) Act, 1925, but no infringements of the Act were reported during the year.

This comprehensive and illuminating report concludes with a table and diagrams illustrating the salient points arising out of the operation of the Diseases of Animals Acts, including the Tuberculosis Order, in the county during the years 1926-35 inclusive.

The cost of an adequate diet, 9s. to 10s. per head per week, is beyond the purchasing power of one-third of the community. There is no difficulty about producing the food. The difficulty is in enabling the food to be purchased.—*Sir John Orr.*

Review

[**Wünschelruten Versuche an der Tierärztlichen Hochschule, Hannover.** Divining-rod Tests at the Veterinary School, Hannover (Regional Disease Diagnosis; Earth Rays and Water Veins in Animal Stables—Influence on Growth and Virulence of Disease Organisms). Götze, R., and Miessner, H., with collaboration of Joh. Müller, Joh. Liesz and K. Hansen. With 54 illustrations and 12 tables. Hannover: M. & H. Schaper. (1936.) R.M.1.50.]

In view of the considerable claims which had been made for the value of the divining-rod in the diagnosis of regional disease, and the publicity these had received in both medical and veterinary circles, a series of trials was arranged at the Hannover Veterinary College, the diagnoses being made by two well-known exponents of the method.

The report is arranged in three main sections: (1) Divining-rod tests on the living animal and the diagnosis of regional disease; (2) divining-rod tests in buildings; for water veins, earth rays and general health of the occupants, and (3) divining-rod tests with disease-producing organisms—influence on growth and virulence. No evidence was obtained to substantiate the claims made for the method. Not only were neither of the chosen exponents able to foretell with even reasonable accuracy the presence or position of lesions of disease, but they disagreed widely with regard to the same animal and also when they examined the same animal twice. (All animals were covered whilst under examination and were afterwards slaughtered.) Secondly, no connection could be shown between the presence of water veins or earth rays in a building and the health of the occupants. Finally, it was not possible to show that the presence or absence of earth rays had any influence on the growth or virulence of various bacteria or on the fate of animals infected with these.

Irish Free State Livestock Import Regulations Unrelaxed

The Irish Free State Department of Agriculture announces that in view of the outbreak of foot-and-mouth disease at Nuthurst, Horsham, West Sussex, the proposed relaxation of the existing regulations governing the importation of livestock from Great Britain into the Irish Free State has been postponed.

It was intimated in a previous Press announcement that the modification of the restrictions would be contingent on no unfavourable development arising as regards foot-and-mouth disease in Great Britain.

Notes and News

The Editor will be glad to receive items of professional interest for inclusion in these columns.

Diary of Events

Sept. 29th.—Meeting of the Southern Counties Division, N.V.M.A., at Aldershot, 3 p.m.

Oct. 2nd.—R.A.V.C. Old Comrades' Association, Annual Re-union Dinner, Anderton's Hotel, Fleet Street, E.C.4, 7.30 p.m.

Oct. 2nd.—Meeting of the North of England Division, N.V.M.A., at Northallerton

Oct. 5th.—Meeting of the Editorial Committee, N.V.M.A., at 2, Verulam Buildings, Gray's Inn, W.C.1, 4 p.m.

Oct. 9th.—Meeting of the Sussex Division, N.V.M.A., at Brighton, 2.30 p.m.

Oct. 9th.—General Meeting of the Mid-West Division, N.V.M.A., at Trowbridge, 2.15 p.m.

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THE CONGRESS COMPLETED

As was clearly foreshadowed by the proceedings of the first half of the N.V.M.A. Congress, at Scarborough, which we outlined in our issue of last week, the event as a whole stands out as an unprecedented success, and once again we have the gratifying duty of recording that the attendance definitely constituted a record, over 350 members and their ladies having given official intimation of their presence by signing the attendance book.

Resuming the brief account—publication of the full report of the proceedings will be made in the number of this journal to be issued on October 10th—the annual dinner was held at the Royal Hotel on the Wednesday evening, when an outstanding feature of an enjoyable event was the speech of the Right Honourable the Earl of Feversham, making his first public appearance subsequent to his appointment as Parliamentary Secretary to the Ministry of Agriculture. Lord Feversham, in proposing the toast of the Association, took the opportunity to outline Government policy with regard to agriculture.

On the succeeding evening—continuing the "social" side of Congress—the Ladies' Guild held a phenomenally successful dance in aid of the Victoria Veterinary Benevolent Fund, the degree to which this function was appreciated being evidenced by the fact that it was prolonged for some two hours after 2 a.m.—the scheduled time for terminating the festivities. Thursday afternoon was given up to an excursion by motor coach to Ravenscar *via* Oliver's Mount, Hackness, Harwood Dale, etc, in the course of which, in spite of the mist, visiting members obtained a wonderful impression of the glorious Scarborough hinterland and the Yorkshire coast.

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On Thursday morning, Professor Nils Lagerlöf, of Stockholm, gave what was probably the outstanding contribution to the scientific proceedings in a masterly address, with illustrations projected by means of the epidiascope, on the subject of "Sterility in Bulls." Professor Lagerlöf discussed the methods to be adopted for the collection of seminal fluid and its preparation for microscopical examination, pointing out that the alteration in morphology of the spermatozoa played an important part in the diagnosis of sterility, and that motility of sperms, contrary to commonly accepted views, is by no means the sole criterion in this respect.

On Friday morning the paper by Professor Mitchell on "A General Consideration of the Disease Conditions mentioned in the Horse Breeding Acts" demonstrated very forcibly, by the prolonged nature of the discussion, that the horse is still a subject of importance and unremitting interest to the veterinarian.

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The Annual General Meeting was resumed at 3 p.m. on Saturday the 18th instant, when some tangible expression of our indebtedness to the local Secretary, Mr. E. F. McCleery, for his untiring efforts on our behalf was given by the presentation to him, at the hands of the retiring President, of an antique sideboard and table, whilst Miss Powley, daughter of the Chairman of the local Provisional Committee, who had assisted materially on the secretarial side, was presented with a gold wristlet watch. The retiring President then invested Captain Simpson, of Carlisle, with the regalia of office as President of the Association. The first duty of the new President was to propose a very hearty vote of thanks to the retiring President, Captain Barker, for his unrivalled efforts during his term of office. Thanks were also accorded to all those who had contributed in such full measure to the success of the Congress.

The Annual General Meeting was preceded by a Council meeting, at which a report of the Finance and General Purposes Committee, containing some very important proposals, was adopted. One of these concerned the payment of a reduced membership subscription to the Association by new graduates, commencing on January 1st, 1937. The concessions made were that those qualifying in July should pay 10s. 6d. for the rest of the year and a reduced subscription of one guinea for the succeeding year. Graduates qualifying in December will pay one guinea only for the first year of

membership. A further important feature was the re-constitution of the Finance and General Purposes Committee, which in future will consist of the Chairmen of all the Standing Committees, the immediate past-President, the President Elect, together with a sufficient number of members of Council to bring the Committee up to the required strength. It was further agreed that the Report of the Special Committee on Small-animal Euthanasia should be issued free to members of the Association and that a charge of 5s. per copy should be made to non-members.

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PERSONAL

Appointment.—Mr. U. F. Richardson, B.Sc., M.R.C.V.S., has been appointed Lecturer in Epizootiology in the Royal (Dick) Veterinary College, Edinburgh. The appointment is a new one, and, as Lecturer, Mr. Richardson will be responsible for courses leading to the Diploma of M.R.C.V.S. and D.V.S.M. He will also take part in the instruction of post-graduate students preparing for the D.T.V.M. of the University of Edinburgh, for which his experience of twenty years' colonial service in Uganda has made him eminently fitted.

Will.—Mrs. Florence Jane Ewin, of Kingston Hill, who died on June 20th, aged 59, widow of Captain Claude A. A. Ewin, left, among other bequests, £2,000 to the Royal Veterinary College for an annual scholarship.

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R.C.V.S. OBITUARY

The Late Mr. E. C. Sparrow

Mr. E. C. Sparrow, an "Existing Practitioner," whose death we recorded with deep regret in our last issue, was a well-known figure in the veterinary profession, coming of an old-established family of veterinarians. He saw practice with the Hurrells, at Southminster, then set up for himself at Woodham Ferrers and later joined and succeeded his father at Rayleigh, where he practised for over forty years, during which time he built up one of the largest mixed practices in Essex. Many veterinary surgeons acted as assistants to him during his long period in practice, including his son-in-law, Lieut.-Colonel J. R. Hodgkins, R.A.V.C. After the War he took Mr. W. G. Evans, who now owns the practice, as a partner and was succeeded on his retirement early in 1924 by Mr. H. E. Bywater.

Since his retirement he has lived with his younger daughter at Huddersfield, has been a frequent visitor to our Congresses and has acted as locum tenens for many of his professional friends, being ever ready to give freely of his services in the management and disposal of practices consequent upon the illness or death of the principal. Mr. Sparrow was a prominent Freemason, and had been Treasurer of the Trinity Lodge, Rayleigh, for over 40 years and among the masonic honours which he held was the rank of Past Provincial Grand Warden.

Following cremation at Bradford on the 14th inst., the ashes were interred in the family grave at Rayleigh Churchyard on the succeeding day, when a large and representative gathering was present to pay the last tributes.

The veterinary profession was represented by Mr. H. F. Sparrow, of Rochford, Mr. M. T. Sparrow, of Great Baddow (brothers), Mr. H. D. Sparrow, Rochford (nephew), Mr. R. Hodgkins (grandson) and Mr. H. E. Bywater.

A large number of Freemasons escorted the ashes into the church and filed past the grave after the interment.

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R.C.V.S. CENTRAL LIBRARY FOR ANIMAL DISEASES

Following is a list of books and other publications recently acquired by the above Library:—

Brook, G. B. "Experimental and Clinical Studies of the Spine of the Dog." 1936.

Jervis, John. "The Horse and Carriage Oracle (revised by William Kitchiner, M.D.) 3rd ed. 1828.

Lachenschmid, B. "Praktikum der tierärztlichen Schlachtviehund Fleischbeschau." 1935.

Liess, J. "Die Endoskopie beim Rinde." 1936.

Standfuss, R. "Bakteriologische Fleischbeschau." 3rd ed. 1936.

Nowak, J. "L'Institut Vétérinaire de Cracovië (reprint from Ann. Inst. Pasteur). 1928.

Fifty-nine papers from Brno Veterinary School (mostly in Czech).

Thirty-eight dissertations from University of Munich (nearly all veterinary).

British Goat Society. Herd-Book No. 51, January-June, 1936.

British Goat Society. List of goats accepted under Stud Goat Scheme, Season, 1936-37.

Certified milk. Proceedings of Conferences of the American Association of Medical Milk Commissions, etc., 1932, 1933, 1934 and 1935.

National Association for the Prevention of Tuberculosis. Transactions of the 22nd Annual Conference, July, 1936.

City of Aberdeen. Medical Officer of Health's Report for 1935 (includes veterinary services).

Berks County Council. Report of Chief Veterinary Officer for 1935.

County Borough of Blackburn. Annual Report on the Health of Blackburn for 1935 (includes veterinary services).

Burnley. Reports of Medical Officer of Health for 1935 (includes veterinary services).

County Council of Durham. Annual Report of Chief Veterinary Officer for 1935.

City and Royal Burgh of Edinburgh. Report of Veterinary Department for 1935.

City of Liverpool—Health Committee. Report of Chief Veterinary Officer for 1935.

City and County of Newcastle-upon-Tyne. Annual Report of Veterinary Officer for 1935.

Surrey County Council. Annual Report of Chief Veterinary Officer for 1935.

West Ham. Report upon Health Services for 1935 (includes veterinary services).

West Riding of Yorkshire. Ninth Annual Report of Chief Veterinary Officer for 1935-36.

West Sussex County Council. First Annual Report of Chief Veterinary Officer for 1935-36.

County of Wigtown—Public Health Department. Report of County Veterinary Inspector for 1935.

Basutoland. Annual Report of Department of Agriculture for 1934-35 (includes veterinary services).

Government of Bengal. Annual Reports of Civil Veterinary Department and of Bengal Veterinary College for 1934-35.

Ceylon. Administration Report of Government Veterinary Surgeon for 1935.

County Borough of Cork. Report of the Medical Officer of Health for 1935 (includes veterinary services).

Kenya Colony and Protectorate—Department of Agriculture. Annual Report, 1934. Vol. III, Animal Industry.

Northern Rhodesia—Veterinary Department. Annual Report for 1935.

Sudan Government. Annual Report of Veterinary Services for 1935.

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A catalogue of the books in the Library published since 1900 is now on sale, price 1s. post free. Remittance to be sent with order to the Secretary, R.C.V.S., 10, Red Lion Square, London, W.C.1.

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ARMY VETERINARY SERVICE

LONDON GAZETTE—WAR OFFICE—REGULAR ARMY

Sept. 15th.—The following to be Lieutenants (on probation) (Sept. 9th): J. Hickman, G. D. Young, R. Millar, D. A. Green.

TERRITORIAL ARMY

Captain H. W. Brekke to be Major (June 4th).

Sept. 18th.—His Majesty the King, under the terms of the Royal Warrant dated October 13th, 1920, has been graciously pleased to confer the Territorial Decoration upon Major C. E. W. Bryan, R.A.V.C.

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GERMAN SHEPHERD DOGS: ALSATIANS' NEW NAME

"After a good many years the Kennel Club committee has authorised a change in the name of the Alsatian," states the Kennel Correspondent of *The Times*. "A tentative step in the right direction was made when it was decided that the use of the words Wolf Dog should be discontinued. Being herding dogs, they had less right to that qualification than some of the French and Italian sheepdogs, whose duty it was at one time to protect the flocks from wild animals. The formidable-looking Komondor in Hungary is still employed in this manner. The Kennel Club has acted wisely in making the change gradually. Perhaps in a few years the word Alsatian will disappear and the breed will be known here, as in other parts of the world, as German shepherd dogs. An abrupt decision, by bringing confusion into the public mind, might have damaged the breed."

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H.M. STATIONERY OFFICE PUBLICATIONS

The undermentioned have been published recently. Copies can be purchased through any bookseller, or indirectly from H.M. Stationery Office, at the following addresses: London: Adastral House, Kingsway, W.C.2, and 28, Abingdon Street, S.W.1; Cardiff: 1, St. Andrew's Crescent; Manchester: York Street; Edinburgh: 120, George Street.

	Price Net.		*Post Free.*	
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WAR OFFICE:—				
Veterinary Services, Army, Regulations, 1932. Amendments No. 5, August, 1936. (57-9999).	0	1	0	1½
AGRICULTURE AND FISHERIES, MINISTRY OF:—				
Bulletin No. 48. Rations for Livestock. 9th Edition, August, 1936 (24-201-48-36).	1	0	1	2

THE SCOPE OF TEACHING AND RESEARCH IN ANATOMY

The introductory paper by Dr. W. E. Le Gros Clark, F.R.S., F.R.C.S., read in the Section of Anatomy at the Annual Meeting of the British Medical Association, Oxford, 1936, and to which we made brief reference in our issue of August 8th, was published as follows in the *British Medical Journal*: "Anatomy is the science of the form and structure of living organisms. That is to say, it is concerned with the study and interpretation of those factors which determine or modify form and structure, whether they are chemical, physical, physiological, developmental, or phylogenetic, and with the precise relation between structure and function. It is clear, therefore, that the science of anatomy is very comprehensive in the scope of its inquiry. It is necessary to emphasise this for the reason that, in this country at least, anatomy seems to be regarded by many workers in the cognate sciences as rather a limited subject. If this is the case, the fault is to be found not in the science of anatomy itself, but rather in its accredited exponents.

ANATOMY AS AN EXPERIMENTAL SCIENCE

"In 1628 Harvey's great work on the circulation of the blood was published under the title "An Anatomical Dissertation on the Movement of the Heart and Blood in Animals." This title forms an apt text for a discussion on the scope of teaching and research in anatomy, because it does, by implication, provide a definition of the real meaning of anatomy. The term "anatomy" strictly refers to a *method* of investigation—the study of an organism which involves first opening it up and analysing the component parts of which it is constructed. But the method of anatomy was primarily employed entirely for the purpose of studying functional mechanisms. It was a method developed by the pioneers of biological science, impelled by a curiosity to find out how the body works. These pioneers were certainly not primarily concerned with organs and other structures as pure morphological entities. Harvey was in a large degree responsible for the introduction of the experimental approach to anatomical problems, in particular to problems relating to the functional significance of the various structural systems of the body which are in the first place laid bare by dissection. The experimental approach involved, as an essential elaboration of earlier methods, the "anatomising" of the living as well as of the dead body. It is important to note that this method of study was primarily regarded as a logical extension of the science of anatomy. Historically, therefore, anatomy was initially concerned with the inquiry into the functional mechanisms of the living body.

"It was not until the 17th century that there began to develop an apparent separation between the sciences of morphology and physiology. This contrast became very evident in the latter part of the 18th century and the early part of last century, when pure morphology, as the science of form pure and simple, developed as a separate discipline. The exponents of this science became absorbed in the attempt to define the fundamental unity of plan which served as a theoretical basis for the development of the various types of animals, and to formulate the ideal archetypes of which different organs and anatomical systems might be regarded as modifications in one direction or another. The methods adopted for the prosecution of these

inquiries were of a comparative anatomical and embryological nature. The experimental approach to the study of the significance of form and structure was entirely neglected by pure morphologists for the time being. Naturally enough, Darwin's influence on morphological research was immense. Problems of classification, homology, adaptation, etc., became essentially evolutionary problems instead of the philosophical abstractions of the old idealistic morphology. The recognition of the evolutionary principle demanded an intensive and detailed study of the anatomy of diverse animal types in order to provide adequate material for the application of the evolutionary concept to specific problems.

"With this wide field of inquiry inviting the attention of anatomists it is not surprising that they continued still further to ignore the original aims of anatomical science—the study of form and structure from the point of view of their functional significance in the living organism. Meanwhile, experimental technique in the study of biological problems was being rapidly developed by physiologists who were primarily interested in the chemistry and physics of living processes. Thus there arose the curious conception that any experimental work on the living body was essentially the province of physiology rather than anatomy, while the latter came to be regarded as dealing exclusively with the dissection of the dead body. This tradition has survived for many years in this country, to the great disadvantage of the science of anatomy. It is interesting to note that in America, where the different branches of modern biological science have crystallised out in a natural and logical way without the hampering distortions of traditional bias, this artificial contrast between anatomy and physiology has never really arisen. American journals of anatomy are almost as richly supplied with records of experimental investigations as are the journals of physiology. Consequently anatomical science in America has until recently been far more progressive and dynamic than in this country. It is of the utmost importance that we, as anatomists, should realise this position. In the realm of pure morphology the vast amount of observational records of human and comparative anatomy which have been collected have gone far beyond the morphological and evolutionary theories which can explain them. More extensive research along these lines is unlikely to lead to very profitable results for the time being. It is necessary, meanwhile, that anatomists should turn their attention to more productive fields of research in the scope of their science, and this necessarily involves the extensive employment of the experimental method.

Anatomy and Physiology: Their Spheres of Activity

"It may be asked by those who are not conversant with the aims of anatomical science, wherein lies the difference between anatomy and physiology if both use the same technique in their investigations? The answer is that although they are both concerned with the same type of problem—the analysis of the mechanism of living processes—they approach these problems from rather different angles. There is really no difficulty in defining their spheres of activity as natural subdivisions of biological science. The anatomist is primarily interested in the significance of structure and growth and their relation to function; the physiologist is, on the other hand, primarily interested in the physics and chemistry of the living organism and in the detailed analysis of the functional processes which have their basis in anatomical structure. To achieve results both must resort to the experimental method. It has been remarked that, in adopting this method, the anatomist generally aims at disturbing or modifying the normal functions in order to study the ensuing changes in the structural mechanisms which are involved, while the physiologist, in his researches, is concerned with studying function by interfering with or modifying the structural mechanisms which underly it. For example, the anatomist interested in the structure and growth of bone may require to study the structural changes which occur in bone following an experimental disturbance of endocrine functions. The physiologist, in studying the functions of the cerebellum, may find it necessary to interrupt the anatomical paths by which the cerebellum is linked up with other parts of the central nervous system in order to observe the resulting disturbances of muscular action. Their studies are mutually complementary.

"Clearly it is undesirable and, indeed, impossible to confine either the anatomist or the physiologist within the strict limits of his science as arbitrarily defined by custom. The physiologist, in the course of his work, will sometimes find it necessary to direct his attention to the structural mechanism itself, although this is properly speaking the province of anatomy. It may sound paradoxical, but it is nevertheless true, that some of the best anatomical research on the nervous system in this country has been carried out by a physiologist, Sir Charles Sherrington, in unravelling the intrinsic anatomy of the brain and spinal cord, defining the topography of motor and sensory tracts, and determining the anatomical composition of the limb plexuses. Conversely, the anatomist, in his study of structural mechanisms, may require to pursue his studies into the realm of pure function in order satisfactorily to understand the full significance of the gross and minute anatomy of these mechanisms. Indeed, in many ways the anatomist is peculiarly well equipped by his training and outlook to appreciate the real nature of functional problems, simply because he views as a whole the experimental animals with which he deals. He has a detailed and intimate knowledge of their entire structure (macroscopical and microscopical), of their embryological development, of their taxonomic position, and of their phylogenetic origin. He deals with functional processes, therefore, not so much as artificial abstractions to be interpreted in a limited way in terms of chemistry and physics, but as integral components of the complete mechanism of a living and evolving organism.

A Change in Orientation

"Experimental anatomy is not only essential for interpreting the functional significance of structure, it also provides the most important technique for the study of anatomical problems of growth, development, and tissue differentiation. It is a matter of common knowledge that the development of tissue culture and experimental embryology has in recent years opened up a vast field of anatomical research which promises to take us far beyond the knowledge which we have been able to gain by the study of fixed and stained sections of normal material. Anatomists in this country are realising now that if their science is to develop along progres-

sive and active lines they must once more become essentially experimentalists. This change in the orientation of anatomical science has not hitherto been fully recognised by their biological and clinical colleagues, and it is precisely for this reason that I am now emphasising it. It has been my privilege, as president of the Section of Anatomy, to arrange with my committee the programme of this Section, and I have asked four of my anatomical colleagues to give a short report on the progress in their own particular fields of work in order to illustrate the present trend of anatomical research in this country.

The Teaching of Anatomy

"One of the main duties of the teacher of human anatomy is the provision of facilities for the study of the topographical anatomy of the human body by medical students as a very necessary preliminary for clinical practice. No one doubts that, before he can deal successfully with the subjects of medicine and surgery, the medical student must lay the foundation of a sound knowledge of the 'geography' of the human body. For this reason it will always remain necessary for him to make a dissection of the whole body (usually in collaboration with his fellow workers), some time during the course of his training in preclinical subjects. But in recent years it has come to be realised generally that he should not be required to learn and commit to memory for examination purposes so vast an amount of topographical detail as is to be found in standard anatomical textbooks. This opinion finds expression in the recent report on the medical curriculum issued by the University of London. In this report, also, it is suggested that the time which has been usually spent by medical students in the dissection of the human body could be appreciably cut down. This can almost certainly be done to some extent if less emphasis is laid by examiners in anatomy on unimportant details which may have to be learnt and re-learnt several times if they are to be retained in the memory for the examination. I am heartily in agreement with those who hold that the student may conveniently be tested for a knowledge of the *details* of anatomical topography as he goes through his course of dissection, by informal departmental examinations, while the M.B. examination in anatomy should rather test his knowledge of broad anatomical principles and general topographical relationships.

"The teaching of straightforward topographical anatomy is in many ways the least difficult duty of the teacher of human anatomy. I would like to emphasise this because there is sometimes expressed the view that the teaching of pure topographical anatomy requires mental powers of quite an unusual type. This is not really the case, and it is difficult to understand how such an idea should have arisen. It requires no particular intellectual acuity to learn up the data of topographical anatomy necessary for medical education, nor does it require any mental effort to give out this knowledge in a palatable form which can be easily assimilated by the medical student. I would assert that anyone who has any teaching ability at all would be able to deal adequately with so straightforward a subject. It is necessary to draw attention to this common misconception, for I have the impression that in appointments to anatomical posts it often tends to favour the candidate who has established a reputation as a hack teacher in dissecting-room anatomy to the disadvantage of the candidate who has distinguished himself by brilliant research. It is a tragic circumstance for the progress of anatomy in this country that this should be so, for my own experience is that the man whose mind is kept alert and active by original research is usually by far the best and most stimulating teacher, whether he is dealing with ordinary topographical anatomy or the more intellectual aspects of his subject. To be able to discuss in lectures to students the bearing of current research on the anatomical problems of development, growth, functional adaptation, etc., does demand very considerable mental ability, together with a wide acquaintance with current anatomical and physiological literature.

"It is very important that in the routine teaching of topographical anatomy form and structure should always be correlated with function. Only in this way is it possible to secure in the student's mind a proper co-ordination between the anatomical and physiological aspects of the living body. In dealing with the functions of the kidney the teacher of physiology must necessarily introduce his subject with a brief outline of the gross and minute anatomy of this organ although this is really the province of anatomy. Conversely the teacher of anatomy, in dealing with the details of the macroscopical and microscopical structure of the kidney must necessarily refer, however briefly, to the functional significance of the glomeruli and the various parts of the renal tubules if he is to make his subject really intelligible. It is obvious, therefore, that the efficient teacher of anatomy must cultivate a physiological outlook. I suspect that the lack of this physiological outlook has been in part responsible for a considerable loss of prestige by the science of anatomy in this country.

Histology

"One of the most vital parts of anatomical science is histology or microscopical anatomy. To most people it may seem absurd to make an obvious statement that microscopical anatomy is anatomy, but it is necessary to do so because there is still in this country some difference of opinion as to the proper place of microscopical anatomy in the medical curriculum. Kölliker, one of the founders of modern histology, in defining anatomy, states that 'Anatomy is and remains the science of the structural parts of the organism and of the laws of their origin and transformation, whether these structural parts are visible to the naked eye or only through the microscope." By an accident of circumstance, however, when anatomy and physiology came to be separated into different teaching departments in British medical schools, the teaching of microscopical anatomy was taken over by the physiologists. This was due in part, no doubt, to the fact that at that time the attention of anatomists was occupied in collecting morphological data for the elucidation of evolutionary processes. Since then this anomalous position of microscopical anatomy has persisted in most medical schools in this country. Exceptions are found in University College, London, Guy's Hospital Medical School, the Universities of Wales, Manchester, and Liverpool, and, partially, in the University of Glasgow. The remarkable custom of teaching an important section of anatomy in departments of physiology seems to be quite peculiar, for in other European countries, apparently without exception, microscopical anatomy is taught either in institutes of anatomy or in institutes devoted to histology and embryology. From the methodological point of view there can be no doubt but that practical classes in microscopical

anatomy should be given in departments of anatomy. The anatomist, in dealing with structure, must of necessity be constantly referring to histological details. The whole anatomical significance of an organ like the liver or the pituitary gland ultimately rests on its minute structure. While, therefore, the anatomist finds it necessary to teach histology in lectures and demonstrations, in most British schools he has no control over the arrangement of practical classes which would enable him to demonstrate practically what he teaches. This illogical state of affairs is quite intolerable. One argument which is frequently raised against the suggestion that practical histology should be handed over to its rightful position in departments of anatomy is that histology is essential for the proper understanding of physiology, and that the two subjects should therefore be taught in the same department. There is really no reason at all for this provided that histology is taught in *some* department concurrently with the course in physiology. Other subjects such as physics, chemistry, and biochemistry are equally essential for a proper understanding of physiology, and yet they are taught in different departments. It might be argued that a knowledge of microscopical anatomy is also essential to a proper understanding of anatomy, were it not that such a statement is absurd in itself. For the fundamental fact is that microscopical anatomy *is* anatomy.

"I would plead with those who control the organisation of teaching in medical schools that they should give their assistance to obtaining a fair and logical division of subjects in accordance with the natural content of each branch of science which is taught. Unless the anatomist is allowed to control the teaching of the whole range of his own subject he will find it extremely difficult to give expression to his desire to develop his science along progressive lines.

"One very cogent reason why the anatomist should be responsible for the teaching of practical histology is that he is already concerned with teaching embryology. This subject, of course, involves the application of histological technique, and it forms an important part of the curriculum in anatomy for the medical student because of the light which it throws on adult form and structure. It is clearly quite ludicrous that the anatomist should teach the details of histogenesis and organogenesis, while practical instruction in the minute structure of adult tissues and organs is carried out in a separate department altogether.

Conclusion

"In this discussion I have confined myself to those aspects of the teaching of anatomy and anatomical research which call for special consideration because they are expressions of a new outlook in what is one of the most venerable of all the sciences. If I have omitted reference to such subjects as neurological anatomy, radiological anatomy, physical anthropology, and the comparative anatomy of the Primates, it is only because the place of these in anatomical teaching and research is already fully recognised. The revivification of anatomy in this country is already apparent in the attention which is now being paid by anatomists to experimental work and cytological technique. It is essential that these aspects of the science should henceforth be fully incorporated in the scope of the activity of recognised departments of anatomy, and that these departments should be equipped with all the facilities necessary for their development."

VIRUSES AND NEW GROWTHS

The Lancet (August 8th) states in a leading article that the discussion which attracted most general attention at the recently-held International Congress of Microbiology was undoubtedly that on "evidence concerning the agency of viruses in the aetiology of new growths," and continues: "This was partly attributable to the universal interest in new growths, partly to the definite progress made in this particular aspect of their study, and partly to the fame of the investigators gathered together from the ends of the earth to exchange experiences. The Committee were fortunate in securing Peyton Rous, whose achievements in this field (including his recent demonstration of the influence of a virus in the production of tar cancer in the skin of the rabbit) are most important, to preside at the meeting and to open an exciting discussion. In its course G. P. Berry and his colleagues described the steps by which they have shown that when the virus of rabbit myxomatosis is inactivated by heat, the addition of the Shope rabbit 'fibroma' virus restores to the 'dead' myxoma virus its original virulence. G. Oberling, J. Fürth and J. Engelbreth-Holm gave accounts of the filtrable leukoses of fowls and discussed the association of the virus of these diseases with avian filtrable tumours. P. R. Peacock detailed a long and careful series of experiments in which he had failed to demonstrate the presence of a virus in a number of fowl sarcomata produced by the injection of tar. His experience appears to be shared by others, but on the other hand J. McIntosh recorded the successful transmission of such tar-induced fowl sarcomata by filtered extracts. The contributions of these and other speakers, though to some extent contradictory, all helped to clarify issues which have become so complex as to warrant some attempt at their re-definition.

"The tumours which are caused by viruses are (1) a large group of sarcomata of fowls, diverse in structure and in clinical characters; (2) a papilloma of the rabbit which exhibits a tendency to become malignant, and in fact almost invariably passes into a squamous carcinoma; and (3) an adenocarcinoma of the frog. All these tumours, though induced by a virus, possess the same properties as the larger group of mammalian tumours in which no virus can be demonstrated. They grow by multiplication of the cells primarily affected, and they spread through the body by cell metastasis. They occur sporadically and are not contagious either under natural or under comparatively crowded experimental conditions. The infection, if the word is appropriate, is an infection of the tumour cells and not of the body of the host. It is evident that the virus tumours cannot be ignored in any discussion on the aetiology of new growths; nevertheless, it must still be recognised that in most tumours, both of the small mammals which form the chief material for experimental research, and of human beings, we have no definite evidence that a virus plays a part. There is one exception to this generalisation which has not received its full share of recognition—namely, certain brain tumours of man in which Dr. Dorothy Russell has demonstrated the presence of acidophilic intranuclear inclusion bodies.

"The problem set by the existence of true neoplasms which are induced by viruses, and of true neoplasms in which it has not been possible to discover a virus, has not yet been solved. Experiments designed to throw light on it were described at the congress by C. H. Andrewes

and by W. E. Gye and L. Foulds. These investigators have studied avian tumours produced experimentally by injections of tar or of dibenzanthracene. The tumours induced by carcinogenic substances are propagated only with difficulty by cell grafts and are non-filtrable, which implies that no direct evidence of the presence of a causative virus has been obtained. Andrewes found that a tar tumour of this sort grows with comparative vigour in pheasants and that the pheasant host of the tumour develops during its growth an antibody, recoverable from the blood, which neutralises the virus of the Rous sarcoma. Gye and Foulds injected rabbits with Berkefeld filtrates of a 'non-filtrable' dibenzanthracene tumour, and found that the blood-serum of the rabbits acquired the power to neutralise viruses obtained from other filtrable fowl tumours. Evidence of this sort suggests that, although the filtrates of these growths have no power to start a new tumour in chickens, they nevertheless contain a virus immunologically related to, if not identical with, the virus which causes the Rous sarcoma. Does the virus thus obtained from an artificially induced tumour function within the tumour cells as a causative virus in the same way as the virus acts in a malignant cell of the Rous or other filtrable neoplasm? Or is the virus carried as a 'passenger' in the substance of the tumour? If the first explanation turns out to be correct—and it seems unlikely that a tumour not caused by a virus would carry mechanically a virus which causes another tumour—it remains a puzzle that a tumour should be induced by a virus which is inactive when separated from the tumour cells. There are, it is true, analogous problems associated with other virus infections and the solution of even one such puzzle would doubtless provide clues to the rest. If the second suggestion is correct, that is, if the virus is carried as a 'passenger,' then we must make a different assumption, one vigorously upheld by T. Rivers in the course of the discussion on this work. This assumption is that as the tumour started by the action of the chemical agent grows, the virus of the Rous sarcoma which may exist in a non-infective form within the body of the host,[1] is attached to the growing cells of the tumour and settles and lives harmlessly in or on the growing cells.- This phenomenon of a virus finding a suitable nidus for growth in tumours has indeed been observed again and again. The virus of infectious ectromelia, for example, will live indefinitely in mouse carcinomas. But before this explanation is accepted other well-established facts concerning filtrable tumours must be considered. Some of the tumours which are normally easy to transmit with cell-free filtrates often go into a phase in which it is not possible to obtain an active extract; this phase of 'non-filtrability' may last for months. Does the virus disappear when the phase comes on, and reappear when the tumour again becomes filtrable? Or is the virus carried as a 'passenger' without a function in the tumour during one phase, only to become a true active tumour-virus when the non-filtrable phase disappears? The subject, as we have already observed, becomes more and more complex and incidentally more and more fascinating. Further work will doubtless settle these issues at no distant date, but in the meantime it is fair to point to the difficulty of believing that the same tumour can at one time be caused by a virus and at another time be a mere imitation of a virus tumour. Tumours have such clearly defined and recognisable characteristics that it is hard to believe that any individual one can have multiple causes.

"The conventional and most popular explanation of the properties of new growths, is that a tumour cell is a normal cell which has undergone a permanent irreversible alteration of which autonomous multiplication is merely the outward and visible sign. This is essentially the suggestion that a tumour cell is a mutation. The virus hypothesis supposes that a tumour cell multiplies chaotically because of the continuous stimulus provided by an intracellular virus. For some, the minority, of tumours the virus explanation is generally accepted. Whether it has a universal application still remains to be proved."

[1]That it can exist in this state is proved by the fact that normal fowls often develop antibodies to the Rous virus.

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CATGUT AND TETANUS

The importance of efficiently sterilised surgical catgut is emphasised in a memorandum issued by the Ministry of Health, price 2d. It is stated that the recent occurrence in rather rapid succession of several groups of cases of human tetanus infection after surgical operations in which catgut had been used has called particular attention to the dangers of inefficiently sterilised catgut.

The patient for operation into whose body is introduced catgut sold as "sterilised surgical catgut" (*i.e.*, catgut manufactured or imported under licence) may be regarded as adequately safeguarded from tetanus infection from this source, but in many hospitals catgut is still in use which is not controlled under the Therapeutic Substances Act, but is bought as raw catgut and is "sterilised" in the hospital itself by a process which may or may not be satisfactory. In nine cases (of which five proved fatal) occurring in three groups which have recently come to the notice of the Ministry of Health the evidence pointed very strongly to such "home cured" catgut as the source of infection.

The memorandum adds that there is good reason to believe that some cases of post-operative tetanus infection never come to the notice of the Ministry of Health, especially those cases in which recovery occurs. "It is clear, therefore, that the dangers to the public from the use of inefficiently sterilised surgical catgut deserve very serious consideration by all bodies responsible for hospitals in which surgical operations are performed." It is pointed out that the whole question has been discussed in considerable detail in a paper recently published, "Sterilised surgical catgut," by Sir Weldon Dalrymple-Champneys.

It is stated that catgut is often sold as "internally sterile" or "partially sterilised," and as it is not called "sterilised surgical catgut" or claimed to be ready for surgical use it does not come under the control established by the Therapeutic Substances Act. Unfortunately, purchasers of such "internally sterile" or "partially sterilised" catgut are apt to assume that this product requires less sterilisation than "raw" catgut, and some of the wound infections after the use of catgut sterilised by hospitals for their own use are probably directly attributable to this belief, which experiment has shown to be erroneous.

"There are many problems connected with sterilised surgical catgut which require further investigation, including its fate when introduced into the human body, the conditions under

which micro-organisms which have survived in its interior may multiply and infect the patient's tissues, and the best method of ensuring the sterility of the catgut while preserving those physical properties upon which its usefulness to the surgeon depends. In the meanwhile the following conclusions can be drawn from our present knowledge of the facts: The efficient sterilisation of catgut for surgical purposes is far from simple, and presents special problems. Serious danger attends the use of raw catgut, or so-called internally sterilised catgut, to which sterilising processes of doubtful efficacy are applied in the hospital. Many brands of efficiently sterilised catgut controlled under the Therapeutic Substances Act are available. Post-operative tetanus, gas-gangrene, and other infections from surgical catgut can be prevented by the use of catgut manufactured by licensees under the Act or of other catgut sterilised by methods similar to those employed by licensees.

"It is clear, therefore, that the authorities of all hospitals in which surgical operations involving the use of catgut are performed should investigate carefully the origin of the catgut and any method of sterilising it which may be employed in their hospitals, in order to prevent fatal effects of the use of catgut containing the tetanus bacillus or other dangerous micro-organisms."

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THE SEX-LINKED METHOD IN POULTRY BREEDING

"Some years ago, in Cambridge, a few scientific workers were investigating the nature of heredity by means of breeding experiments," says the Ministry of Agriculture in a recent Press Service communication. "Among the discoveries made by them was one that seems destined to play a considerable part in the development of the poultry industry. This was the discovery that the hen transmits certain characters to her male progeny which she does not transmit to the females. By taking advantage of this peculiarity the breeder is now able so to arrange his matings that he can distinguish, *with absolute certainty*, between the sexes of his chicks as they hatch.

"It is, however, only from certain types of mating that this distinctive result can be obtained. Most of the characters of domestic poultry that have hitherto been investigated follow the ordinary rules of what has been termed Mendelian heredity; either parent transmits equally to either sex of the offspring. Characters transmitted by the hen solely to her male offspring are fewer in number, and of these there are only four that are likely to be of commercial value. These four characters are (1) silver ground colour of plumage and down as opposed to gold, (2) barred plumage (such as is found in Plymouth Rocks) as opposed to unbarred plumage, (3) certain forms of light-shank colour as opposed to dark-shank colour, and (4) slow feathering as opposed to rapid feathering.

"The following examples of the results obtained by the sex-linked method will be of interest: A hen of any silver breed transmits silver to her male and gold to her female offspring, whereas a cock of the same breed transmits silver equally to both sexes of his offspring. Now silver in poultry is dominant to gold, so that if a bird gets the silver character from one of its parents it is a silver, even though it gets gold from the other parent. Thus, if a pure Light Sussex cock, a breed belonging to the silver class, be mated with a Red Sussex hen, a breed belonging to the gold class, all of the progeny will be silver. The silver that they all receive from their father is dominant to the gold that they get from their mother.

"If, however, the cross is made in the reverse way by mating a Light Sussex hen with a Red Sussex cock, a strikingly different result is obtained. The cockerel chicks are all silvers as before, but the pullets are all golds, much like their Red Sussex father. This is because the Light Sussex hen, no matter how purely bred, transmits the dominant silver character to her male offspring only. To her female progeny she transmits gold, and since the Red Sussex cock transmits gold to all of his offspring, these first-cross pullets receive gold from both parents and grow into birds of the gold class. The important point for the breeder is that the distinction between the gold and the silver classes in these Sussex fowls is already marked in the down as soon as the chicks hatch.

"Those who are interested in the sex-linked method will find much useful information in the Ministry's revised edition of Bulletin No. 38, originally prepared by Professor Punnett in 1926 and now brought up to date by him. They will also be interested in the author's remarks concerning the advantages and disadvantages of the recently revived Chinese practice of sexing newly-hatched chicks by examination of their conformation, a method in which the Japanese would appear to be most expert. The Bulletin has some excellent coloured plates illustrating the various breeds of chicks, and can be obtained from H.M. Stationery Office, Adastral House, Kingsway, London, W.C.2, price 9d., post free 10d.

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THE CAUSE OF DEATH IN INTESTINAL OBSTRUCTION

"Bottin's experiments[1] on dogs lead him to conclude that bacterial infection plays little part in causing the serious sequelae of intestinal obstruction. Such infection might act in three ways: by producing peritonitis, septicaemia, or metastatic foci. Of these he found that peritonitis occurred only through leakage along the intestinal surfaces, and he attributes it to insufficient peritoneal suture at the point of artificial obstruction. Even the finding of organisms (*Bacillus welchii, B. coli,* staphylococcus, and streptococcus) in the peritoneal fluid was not constant, and seemed to bear no relation to the gravity of the animals' condition at the time the fluid was examined. It is true that bacteria could sometimes be found in the blood stream, and more often in the blood taken by cannula from the portal vein than in that from the jugular vein or from the heart. But this bacteraemia was never very severe, and, provided that the operation wound remained clean, the organisms rapidly disappeared from the blood on the restoration of the bowel to normal—*i.e.*, on removing the obstruction. As for metastatic foci, though broncho-pneumonia is fairly often found at autopsy on dogs dying of experimental intestinal obstruction, Bottin does not attach much significance to it. It is common in very young and very old dogs, apart altogether from obstruction, and the organisms recovered from the lungs in his experiments were not those of the intestinal flora. These objections to the view that obstruction kills through bacterial infection gain interest from the evidence published by G. C. Knight and D. Slome[2], and more recently by H. Wahren[3], that a non-bacterial toxin, produced in the wall of the bowel, may be the cause of collapse in cases of intestinal strangulation.

[1] *Rev. belge des sci. méd.* 1936. viii. 46.
[2] See *The Lancet.* 1936. i. 1128.
[3] *Acta Chir. Scand.* 1936. lxxviii. 121.

Wahren produced ileal strangulation under standard conditions in two groups of rabbits. In one group he isolated the affected loop from the rest of the peritoneal cavity with a thin rubber membrane. The animals died from peritonitis after periods ranging from 45 to 89 hours (average 58). In the control group there was no isolation and the rabbits died, generally without peritonitis, at an average of 16 hours after operation. These experiments led to the belief that the intoxication took place chiefly through the peritoneum. It was also found that by applying animal charcoal to the loop, with a little in the peritoneal cavity, life after operation could be prolonged to an average of 27 hours. Pharmacological tests showed that it was not likely that the toxic substance could be histamine, acetylcholine, adenylic acid, or Euler-Gaddam's 'fourth blood-pressure reducing substance,' but Wahren reached no definite conclusion about its nature."—*The Lancet,* July 4th, 1936.

Correspondence

Letters to the Editor should reach the Office not later than by the first post on Tuesday morning for insertion in following Saturday's issue.

All correspondence must bear the name and address of the contributor for publication.

The views expressed in letters addressed to the Editor represent the personal view of the writer only and must not be taken as expressing the opinion or having received the approval of the N.V.M.A.

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PRINCIPALSHIP OF THE ROYAL VETERINARY COLLEGE: A DISCLAIMER

To the Editor of the Veterinary Record

Sir,—In many ways it was perhaps regrettable that such great publicity should have been given in the lay Press during the week of the N.V.M.A. Congress to my impending resignation; but in consequence of what I have heard from one or two friends, the idea appears to be abroad in some minds that I was the instigator of this publicity. I must take this early opportunity of most strenuously denying this allegation. No doubt a well-wisher thought fit to ventilate the question in my interest, but it was certainly entirely without my knowledge or consent.

I had indeed contemplated asking for a public enquiry into the whole facts but on further consideration I concluded that such a course might be detrimental to the interests of the College, which interests I have always had so much at heart; but even at this late stage, unless my honour is vindicated publicly I may yet be forced into this course. I cannot even now understand the attitude adopted by the Governors, two of whom have already so emphatically expressed their disapproval by resigning.

Yours faithfully,
Frederick Hobday.

Royal Veterinary College,
Great College Street,
Camden Town,
London, N.W.1.
September 21st, 1936.

The Ministry of Agriculture and Fisheries has been informed that, owing to the outbreak of foot-and-mouth disease at Nuthurst, Sussex, which was confirmed by the Ministry on September 6th, the Canadian Department of Agriculture has suspended the issue of permits for the direct importation of cattle, sheep, goats and swine from England and Wales. Permits will, however, be granted for importation through the London Quarantine Station. Permits for direct importation from Scotland are still obtainable subject to certain conditions.

Diseases of Animals Acts
SUMMARY OF RETURNS

Period.	Anthrax.		Foot-and-Mouth Disease.		Parasitic§ Mange.		Sheep Scab.	Swine Fever.	
	Outbreaks confirmed.	Animals attacked.	Outbreaks confirmed.	Animals slaughtered as diseased or exposed to infection.	Outbreaks reported by the Local Authorities.	Animals attacked.	Outbreaks confirmed.	Outbreaks confirmed.	Swine slaughtered.
	No.	No.	No.	No.	No.	No.	No.	No.	No.
Period 1st to 15th Sept., 1936	17	18	1	69	5	5	4	40	35
Corresponding period in									
1935	7	8	—	—	—	1	36	63	36
1934	10	11	2	130	4	9	26	61	40
1933	10	12	3	74	3	3	35	33	23
Total 1st January to 15th September, 1936	329	389	5	448	91	233	167	1,396	983
Corresponding period in									
1935	250	293	34	10,208	84	170	263	1,377	814
1934	274	312	7	584	102	169	435	1,140	715
1933	202	230	65	6,123	112	188	275	1,049	642

Note.—The figures for the current year are approximate only. § Excluding outbreaks in Army Horses.